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**ITU-T**

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OF ITU

**X.36**

**Amendment 2**

(12/97)

SERIES X: DATA NETWORKS AND OPEN SYSTEM  
COMMUNICATIONS

Public data networks – Interfaces

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Interface between Data Terminal Equipment (DTE)  
and Data Circuit-terminating Equipment (DCE) for  
public data networks providing frame relay data  
transmission service by dedicated circuit

**Amendment 2: Frame transfer priority**

ITU-T Recommendation X.36 – Amendment 2

(Previously CCITT Recommendation)

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## **ITU-T RECOMMENDATION X.36**

# **INTERFACE BETWEEN DATA TERMINAL EQUIPMENT (DTE) AND DATA CIRCUIT-TERMINATING EQUIPMENT (DCE) FOR PUBLIC DATA NETWORKS PROVIDING FRAME RELAY DATA TRANSMISSION SERVICE BY DEDICATED CIRCUIT**

## **AMENDMENT 2 Frame transfer priority**

### **Summary**

Frame transfer priority is a frame relay capability allowing networks and DTEs the possibility to apply different priorities to virtual circuits. During the data transfer phase, a virtual circuit with a higher frame transfer priority will have, in general, its frames serviced (processed and transmitted) before the frames of virtual circuits assigned a lower priority. Frame transfer priorities are assigned per virtual circuit and possibly for each direction of the transmission. Frame transfer priority provides frame relay networks with a capability allowing them to support and meet the temporal requirements, such as end-to-end delay, of real-time applications and to offer multiple level of services based on the time-sensitivity requirements of the applications.

### **Source**

Amendment 2 to ITU-T Recommendation X.36, was prepared by ITU-T Study Group 7 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 12th of December 1997.

## FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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**INTERFACE BETWEEN DATA TERMINAL EQUIPMENT (DTE) AND  
DATA CIRCUIT-TERMINATING EQUIPMENT (DCE) FOR PUBLIC  
DATA NETWORKS PROVIDING FRAME RELAY DATA TRANSMISSION  
SERVICE BY DEDICATED CIRCUIT**

**AMENDMENT 2  
Frame transfer priority**

*(Geneva, 1997)*

1) *New clause 13:*

*Add a new clause to ITU-T Rec. X.36 as follows:*

**13 Additional facilities**

**13.1 Frame transfer priority**

**13.1.1 General description**

The frame transfer priority is an optional network facility allowing networks and DTEs the possibility to apply different priorities to virtual circuits. During the data transfer phase, a virtual circuit with a higher frame transfer priority will have, in general, its frames serviced (processed and transmitted) before the frames of virtual circuits assigned a lower priority resulting in a lower end-to-end delay and lower variation of this delay. Frame transfer priorities are assigned per virtual circuit and possibly for each direction of the data transmission. Frame transfer priority provides frame relay networks with a capability allowing them to support and meet the temporal requirements, such as end-to-end delay, of real-time applications and to offer multiple level of services based on the time-sensitivity requirements of the applications.

**13.1.2 Service provisioning and request**

Supporting the frame transfer priority service during the data transfer phase is a network option. If supported, it is also a network option whether the Frame transfer priority applies at the DTE/DCE interface and/or within the network and if different frame transfer priorities per data transmission direction are possible or not. If a network does not support different frame transfer priorities for each direction, the highest priority is used for both directions.

For permanent virtual circuits, Frame transfer priority is assigned at subscription time. For switched virtual circuit subscription parameters may be required to manage by the networks the usage of frame transfer priorities. Frame transfer priority is requested by the calling DTE, the request is processed by the network and transmitted to the called DTE. When progressing the call set-up, the network accommodates the request of the calling DTE based on its own Frame transfer priority capabilities.

When using a permanent or switched virtual circuit with Frame transfer priority requested to the network, a DTE is encouraged to also apply Frame transfer priority when it transmits data to the network or, if applicable, when it switches data internally.

A condition for Frame transfer priority services to provide their expected benefits is such that DTEs do not always use the same priority (possibly the highest one).

It is the responsibility of network operators to build mechanisms that will lead DTEs to request different Frame transfer priority. Such mechanisms could be based on items or combination of items of the following non-exhaustive and non-constraining list, items defined for a DTE/DCE interface and per priority class :

- a different tariff;
- a maximum number (Note 1) of VCs (PVCs + SVCs) per interface;
- a maximum limit to frame information field size per VC;
- a maximum limit (Note 1) to sum of CIR, aggregated per interface;
- a maximum limit (Note 1) to sum of (CIR + EIR) (Note 3), aggregated per interface;
- a maximum limit (Note 1) to sum of Committed burst size (Bc), aggregated per interface;
- a maximum limit (Note 1) to sum of Excess burst size (Be), aggregated per interface;
- a maximum limit (Note 2) to individual CIR, i.e. per VC;
- a maximum limit (Note 2) to individual (CIR + EIR) (Note 3), i.e. per VC;
- a maximum limit (Note 2) to individual Committed burst size (Bc), i.e. per VC;
- a maximum limit (Note 2) to individual Excess burst size (Be), i.e. per VC;

NOTE 1 – Actual value can be an absolute figure or a function of access rate of the DTE/DCE interface.

NOTE 2 – Actual value can be an absolute figure or a function based on the minimum of access rates of the two considered DTE/DCE interfaces.

NOTE 3 –  $CIR + EIR = CIR (1 + Be/Bc)$ .

Regarding traffic policing based on link layer core parameters, different behaviours may exist based on frame transfer priority classes (possibly more constraining on highest one) in case CIR and EIR are exceeded.

#### **13.1.2.1 Frame transfer priority indices and classes**

A Frame transfer priority class corresponds to a distinct Frame transfer priority supported by the network. The number and characteristics of Frame transfer priority classes rely highly on internal network capabilities and as such cannot be standardized.

A Frame transfer priority index is an integer from zero to fifteen used at the DTE/DCE interfaces to identify a Frame transfer priority. Zero is the lowest priority index and fifteen the highest. The mapping between frame transfer priority indices and classes is network-dependent. A Frame transfer priority index has a local significance. Therefore, it has a local meaning determined according to the service description of the network a DTE is connected to.

#### **13.1.2.2 Conformance to the Frame transfer priority service**

In order to conform to the Frame transfer priority service, a network must ensure that its mapping between Frame transfer priority indices and classes always satisfies the following proposition:

Let  $i$  and  $j$  be two indices with  $i < j$  then  $FTP\_Class(i) \leq FTP\_Class(j)$ .

In other words if  $i$  and  $j$  are two frame transfer priority indices such that  $i$  is smaller than  $j$ , the frame transfer priority class (FTP\_Class) assigned to a switched virtual circuit requesting a Frame transfer priority index equal to  $i$  shall not be greater than the Frame transfer priority class assigned by the network to a virtual circuit requesting a Frame transfer priority index equal to  $j$ . It may, however, be the same.

In addition a network must ensure that if  $FTP\_Class(j) > FTP\_Class(i)$  the temporal constraints or performance bounds such as delays and/or delay variation assigned to  $FTP\_Class(j)$  are better than those assigned to  $FTP\_Class(i)$ . This Amendment to Recommendation X.36 does not specify what is meant by "better" nor shall it specify specific performance bounds. This is the prerogative of the service provider. Intuitively, it should be expected that a higher FTP\_Class will support a lower delay and/or lower delay variation.



### 13.1.3 Information element

#### 13.1.3.1 Revised list of information elements

The following item is added to the list of information elements of 10.5 of X.36/Amendment 1:

- Priority and service class parameters.

#### 13.1.3.2 Priority and service class parameters information element

The purpose of the Priority and service class parameters information element is to select and identify the frame transfer priority indices of a switched virtual circuit. A different frame transfer priority may be assigned to each data transmission direction. The priority and service class parameters information element is shown in Figure 13.1 and in Table 13.1.

8	7	6	5	4	3	2	1	Octets
Priority and service class parameters information element identifier								
0	1	1	0	1	0	1	0	1
Length of Priority and service classes parameters contents								2
Frame transfer priority identifier								
0	0	0	0	0	0	0	1	3*
Outgoing transfer priority index				Incoming transfer priority index				3.1*

**Figure 13-1/X.36 – Priority and service class parameters information element**

**Table 13-1/X.36 – Priority and service class parameters information element**

<p><i>Outgoing transfer priority index</i> (octet 3.1 bits 5-8) (Notes 1, 2) A binary number in the range of 0 to 15 indicating the Frame transfer priority index for the outgoing direction. 0 denotes the lowest priority and 15 the highest.</p> <p><i>Incoming requested transfer priority</i> (octet 3.1 bits 1-4) (Notes 1, 2) A binary number in the range of 0 to 15 indicating the Frame transfer priority index for the incoming direction. 0 denotes the lowest priority and 15 the highest.</p> <p>NOTE 1 – A Frame transfer priority index has a local significance.</p> <p>NOTE 2 – The term <i>outgoing</i> refers to the calling to called DTE direction and the term <i>incoming</i> refers to the direction from the called to calling DTE.</p>
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#### 13.1.4 SETUP message

Table 10-9 (SETUP message) is modified as follows to include the Priority and service class parameters information element. The modified contents of the SETUP message appears in Table 13-2.

#### 13.1.5 Procedures

The procedures specified in this subclause are specific to the Frame transfer priority capability. They are extensions to the procedures specified in Amendment 1 of Recommendation X.36.

**Table 13-2 /X.36 – SETUP message content**

<b>Message type: SETUP</b>				
<b>Significance: global</b>				
<b>Direction: both</b>				
<b>Information element</b>	<b>Reference</b>	<b>Direction</b>	<b>Type</b>	<b>Length</b>
Protocol discriminator	10.5.1	Both	M	1
Call reference	10.5.2	Both	M	3
Message type	10.5.3	Both	M	1
Bearer capability	10.5.4	Both	M	5
Data Link Connection Identifier	10.5.14	r -> u	M (Note 1)	4-6
Closed user group	10.5.11	Both	O	4-7
Link layer core parameters	10.5.15	Both	O (Note 2)	2-27
Link layer protocol parameters	10.5.16	Both	O	2-*
Priority and service class parameters	13.1.3.2	Both	O	2-4
Reverse charging indication	10.5.18	Both	O	3
Calling party number	10.5.8	Both	O (Note 3)	2-*
Calling party subaddress	10.5.9	Both	O (Note 4)	2-23
Called party number	10.5.6	Both	O (Note 5)	2-*
Called party subaddress	10.5.9	Both	O (Note 6)	2-23
Transit network selection	10.5.19	Both	O	2-*
Low layer compatibility	10.5.17	Both	O (Note 6)	2-*
User-user	10.5.20	Both	O (Note 6)	2-131

### 13.1.5.1 Actions by the calling DTE

To request a specific Frame transfer priority for each direction of a switched virtual circuit, the calling DTE has to include the Priority and service class parameters information element in the SETUP message with the requested indices. The Frame transfer priority indices for the outgoing and incoming directions can be the same or different.

### 13.1.5.2 Actions by the network

Upon receiving a SETUP message that includes transfer priority indices in the Priority and service class parameters information element, the network maps these indices to its internal transfer priority classes it supports. If a network does not support a different frame transfer priority per data transmission direction, the highest priority index is used for both directions. A network may assign a default discard priority class to a switched virtual circuit when the calling DTE has not signalled a frame transfer priority. The value of this default is network dependent.

The SETUP message transmitted by the network to the called DTE contains transfer priority indices in the Priority and service class parameters information element based on the transfer priority class assigned to the call.

If the network is unable to provide the requested frame transfer priorities, it will reject the set-up request with cause No. 49 *Quality of service not available*. If the priority and service class parameters information element is not recognized by the network, the error handling procedures for unrecognized information element apply. When applicable, cause No 29 *Facility rejected* or cause No. 50 *Requested facility not subscribed* may also be used.

In case the network puts some limits on the use of given priorities as described in 13.1.2 and if a particular limit is exceeded at call set-up, the network can adjust the link layer core parameters or clear the call.

### **13.1.5.3 Actions by the called DTE**

If the called DTE receives a SETUP message containing a Priority and service class parameters information element, it may either accept the call if the requested transfer priority indices for the outgoing and incoming directions are acceptable or reject it if one of the requested transfer priority index is not acceptable with cause No. 49 *Quality of service not available*.



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